



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE MECHANISTIC PRINCIPLE AND THE NON-MECHANICAL.

MECHANICALISM AND TELEOLOGY—A CONTRAST.

TWO world-conceptions stand in a strongly marked contrast to each other. One is the mechanistic, the other the teleological, and the struggle between the two is quite severe. It appears that in the combat no quarter is nor can be given. The former conception is held mostly by scientists, by men of thought who are accustomed to rigid method, by believers in theory; the latter by men of action, by jurists, preachers, moralists, reformers, poets, and all those who deal with the human will in practical life, among them also by sentimentalists, by all those to whom hopes and wishes are arguments.

The facts of our experience seem to favor both views in two different realms; the world of inanimate nature is a world of rigid causation where the laws of mechanics rule supreme, but the world of human action seems to make an exception. In the domain of social relations, the will seems to interfere with the mechanical processes of things and a new kind of causation is introduced, the causation of purpose. All mechanicalism means rigid necessity while the causation of purpose is directed by design and provident forethought.

All life pursues a purpose; even the smallest ameba wants to live. Its aim is self-preservation, and this tendency to self-preservation characterizes all life. Each liv-

ing being, the lowest as well as the highest, possesses wants and attends to them. It endeavors to maintain and preserve itself and to propagate its kind; even the highest and noblest animal, man, can do no more, although his self-assertion will aim at the perpetuation of his better self, his ideals.

How are we to explain this contradictory character of the facts with which we are confronted? The scientist claims that the mechanistic principle is and must be true throughout, and we are not prepared to contradict his proposition. On the other hand man *does* plan and design, and his designs determine the future. Are our views of purpose in the domain of life illusions? We are told by some scientists that just as there is no freedom of will, but absolute determinism, so there is really no purpose but only the results of mechanical pressure. The teleological party, however, takes the opposite view and finds purpose everywhere. Even the world of push, the mechanical movements of the stars, are said to be dominated by the purpose of a creator, and our greatest poets declare that ultimately there is a supreme will that governs all.

No one will deny that the world is an orderly cosmos, that the domain of life is characterized by the law of evolution, that the successive stages in the development of rational beings as well as the history of mankind are pre-determined, and a contemplation of the facts verifies the drift of this sentiment. Schiller says:

"And a God, too, there is, a purpose sublime,
Though frail may be human endeavor.
High over the regions of space and of time
One idea supreme rules forever.
While all things are shifting and tempest pressed,
Yet the spirit pervading the change is at rest."

And the poet laureate of the Victorian age echoes a similar idea saying:

"Yet I doubt not, through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

This idea is deeply rooted in the human mind and it is a common conviction that if it had to be surrendered, life would lose its meaning and the world would be as dreary as a sterile desert; all our ideals would become empty dreams, religious comfort would be gone, art would become a vain show of sensuous beauty, and truth would change into an idle quest for a *fata morgana*.

The two propositions seem contradictory and yet we shall undertake to prove that in a certain sense both are rigorously true. On the one hand we claim that all causation is mechanical in the strict sense of the word according to the mechanistic principle; every cause is a motion, every result is accomplished according to conditions and circumstances by changes of place, and all processes that take place are transformations. On the other hand we accept the belief that not only men but even less highly organized creatures are purpose-endowed and above all that the regularities of natural laws, the lawdom of nature, is so intrinsic as to constitute evolution in both the inanimate and the organized domains of existence. This order of the universe is its most inalienable feature which shows itself in a definite direction of development, and in a growth with increasing purpose, a predetermined end or aim called *telos* in Greek, and though the world-order is not a man-made design, it may very well be compared to a plan and is analogous to a premeditated purpose; it acts like one and may be represented as such.

The philosophical term "teleology" is derived from the Greek word *telos* = "aim, end, purpose," and as a theory it assumes that there is design in the world. So far very little, if any, distinction has been made between the meanings "end" as the aim of a direction (in German *Ziel*) and "purpose" as a consciously designed end (in German *Zweck*), but such a distinction will be necessary. Everywhere in nature we see mechanically determined ends, but

not purposive designs. There is, as Germans would say, *Zielstrebigkeit*, a tendency to a predetermined end, but no *Zweckmässigkeit*, no purpose.

If the mechanistic principle is true, it stands to reason that every motion in the universe from the spinning of the tiniest atom to the development of the world as a whole must be dominated by regularity; everything must move in a harmonious order with unfailing consistency and toward a definite aim; or in other words the direction exhibited by all motion of the universe, its aim and end, its *telos*, is not superimposed upon it from the outside by an external power, an extramundane ruler, but is immanent; it is part and parcel of the cosmic constitution; it is as eternal as all the natural laws and is of an intrinsic character.

The mechanical laws of the world are applications of a general norm and this norm is the principle of consistency in motion. It did not originate, it is eternal; it is not God-made, it is part and parcel of God himself. What in religious language people call God, the ultimate authority of conduct, the standard of truth, the directive and formative factors of existence, is this eternal norm which constitutes the cosmic order. We might say that it is the irreversible will of deity which regulates not only this universe of ours but any possible universe. It is the law of nature as we know it, but it is also the law of any possible nature, and in this sense it is supernatural in the literal sense of the term.

PARTISAN SPIRIT.

The methods in the fight between the two opposing parties, the mechanicalists and the teleologists, have not been altogether fair. The representatives of the mechanistic theory generally ridicule the other party as unscientific. They belittle the significance of the human will and treat the consciousness of man's own importance and dig-

nity as a kind of megalomania. In comparison with the infinite expanse of the universe, how inconsiderable is this epiphenomenon of the human soul! Yet a great philosopher who wrote the first "General History and Theory of the Heavens," in which he expounded "the mechanical origin of the whole edifice of the world, according to Newtonian principles," in recognizing the contrast of the two views expresses his awe at two things: outside, the expanse of the starry heavens, and within the human soul, man's conscience. The former is a type of corporeal sublimity, the latter of the sublimity of moral greatness. This little and insignificant inner state within us, our own consciousness, our own will, our own aspirations, and last not least our conscience, the still small voice in man which tells him what he ought to do, affords a peep into the inside of nature. In man's soul appears the efflorescence of that enormous material universe, and here we have a revelation which shows us the meaning, or rather the end and aim, the *telos*, of all these motions and mechanical laws. There is no use in ridiculing the insignificance of this little epiphenomenon, or to declare its growth to be a result of chance; it is here and demands an explanation.

On the other hand the representatives of the teleological view are not less, but rather more, unfair than their adversaries. Many of them are preachers; they moralize and call their antagonists names. They denounce the mechanistic view as immoral, as irreligious, as lacking respect for everything higher and nobler, and treat it as an abomination. Forceful language is always impressive and has its advantages in argument, because it overawes with a show of authority, but if closely considered it never proves anything; on the contrary, it raises the suspicion that the cause for which it is displayed is not otherwise defensible. He who can convince his opponent by good arguments will

scarcely call him names. Only the man without reason turns rude.

As the mechanistic thinkers characterize man's spirituality as a kind of by-play, so the teleologists have only derogatory epithets for nature and the cosmic constitution. Both its laws and its forces are decried as "blind" and "brutal," and a machine is denounced as something utterly contemptible, an inferior thing that lacks intelligence and is dead. While it is true enough that a machine has no life in the sense of a living organism, we ought not to say that its mode of operation, the mechanism of its motion, and still less the mechanistic principle according to which it moves, is low or contemptible. On the contrary a machine is a triumph of mind, and it utilizes that grand constitution of the cosmos, its mechanical law, for a certain purpose which serves human needs. The laws themselves which are applied in the construction of machinery and which machines blindly obey have no eyes as human creatures have, but it would be wrong to have them characterized as blind. We might as well say that mathematics is dumb and dull because there is not any mathematics in itself possessing ears and the faculty of speech or other qualities of a living person. We know that it has not the consciousness of mathematical theorems after the fashion of a professor. Surely it is wrong to denounce these laws in terms of contempt. If we do not understand how to make a proper use of them, they are not brutal, but we are lacking in intelligence and suffer from our own shortcomings.

The theist's accusation that the laws of nature are brutal might be turned against his anthropomorphic God with much greater propriety, for if the forces of nature are brutal in allowing terrible accidents to happen in which many lives are lost, what shall be said of a God, endowed with an ego-consciousness and expecting to be worshiped by his creatures as all-wise, all-good, all-merciful, and also

as all-powerful? The forces of nature are forever the same, they serve the thoughtful if used properly, they destroy the thoughtless who do not utilize them to advantage. But think of a father who watches his children and allows them to drown without a warning, to be wrecked in foolish ventures, to burn to death or to perish in innumerable ways —simply for mysterious, presumably educational reasons! If that be the action of a fatherly God, of a God who in human fashion with a clear omniscient consciousness knows what he is doing, how shall we characterize his providence after having denounced natural forces as brutal?

The laws of nature are certainly not personalities, as the Greeks describe their gods in myth and fable. But while we do not believe that generalizations are conscious beings, we know that certain configurations of conditions produce results of a definite kind and the so-called laws of these conditions are truths; they are certain norms in the objective world, in the world of realities. These norms are highly significant as efficient factors which in the wide illimitable range of our experience have never belied our confidence in them; they determine the uniformities of phenomena with an intrinsic necessity; they make the world intelligible and are therefore illuminating. As they do not obscure the world but guide the course of nature, the word "blind" is misleading. Remember that these blind brutal norms of nature have produced the rationality of man, his foresight and his humanity.

The mechanistic idea is a demand of science which cannot be refused. If causation prevails at all it must be mechanical, but it has taken mankind thousands of years before this consequence of mechanicalism as a universal principle was stated in plain terms, and the first thinker who ventured to pronounce it clearly and boldly was Julien Offray de la Mettrie.

La Mettrie wrote a book entitled *L'homme machine* (published in August, 1747¹), in which he defends the proposition that man is a machine in the sense in which Descartes had claimed that animals are automata.

La Mettrie's book is wittily written, but its arguments are somewhat crudely presented and we can not say that the author has handled his thesis in the proper spirit. He does not enter into the finer problems of intellectual and ideal life, and has not without reason been accused of vulgarity. Nevertheless we must recognize the boldness of his thought, and the heroic stand which he takes on a subject which was extremely unpopular and subjected the author to much persecution.²

La Mettrie's book shocked the world; its author was almost universally condemned and the book itself was denounced as the most infamous production of the human brain. Only a few great minds, foremost among them Frederick the Great, stood up for the lonely freethinker.

La Mettrie's proposition was by no means absolutely new, for the mechanistic principle is an old scientific ideal. The oldest philosophers we know of, the Ionian physicists and also Heraclitus, Democritus, Leucippus, and Epicurus, attempted to construct a world-conception on scientific grounds and to explain the origin of the cosmos on mechanistic principles. It is a consistent conclusion of thought to explain everything mechanically, but our scientists were not always conscious of it as the *sine qua non* of a scientific comprehension. Among the Romans the philosophy of Epicurus was upheld by T. Lucretius Carus in his well-known philosophical poem *De Rerum Natura*, but Cicero in his many writings repudiated both Epicurus and Lucre-

¹The imprint on the title page reads 1748. See Bergmann, *Die Satiren des Herrn Maschine*, p. 14.

²La Mettrie's little book *L'homme machine* has been recently published in French and English by the Open Court Publishing Company, under the title *Man A Machine*.

tius and treated them with contempt as if they were below refutation. In consequence of this unpopularity the works of Epicurus are now lost while the poem of Lucretius has probably survived only because of its literary merits.

During the Middle Ages the scientific method of explaining life was entirely extinct, but with the Renaissance, the mechanistic conception began gradually to revive. Leonardo da Vinci seems to have seen its significance and Descartes actually speaks of animals as living machines, without however drawing the consistent conclusion that if animals are machines man himself must be a machine too. Here, however, he halts, and while he claims that man has a soul, by which he understands a kind of super-mechanical principle, he regards all other animals as soulless.

The mechanistic conception also found a most prominent supporter in Kant, who wrote his famous book on the "History of the Starry Heavens" in which he claims that, given matter in any chaotic state, he would show how on the principle of Newtonian laws an orderly world like our own would develop from it.

Kant discussed the problem of the relation of God to mechanical laws but it would take too much space here to enter into details, nor would a discussion of the subject be profitable in so far as Kant's conception of God has not been clearly defined.³

In modern times many scientists, among them, e. g., Jacques Loeb of New York, have taken the same stand as La Mettrie, and we will mention also that Mark Twain, America's greatest humorist, has joined their cause. We do not hesitate to say that progress in scientific discovery

³ In defending the mechanistic explanation Kant does not deny God, but his explanations are stilted and difficult to condense. He opposes vigorously the view held by Epicurus and other materialists that the world order is the result of chance. In Gustav Wegner's *Kantlexikon* extracts on the subject appear on p. 239 (No. 338) under the caption "*Die Welt von Gott belebt oder ein Gott in der Maschine.*"

and in the explanation of nature's deepest problems is possible only by a strict adhesion to the mechanistic principle.

MOTION AND MOVEMENT.

Let us distinguish between motions and movements. By movements we understand the passive condition of being moved, while by motion we understand an active push. There is a common view that purely physical nature has no self-action, that it is moved. A horse or an animal may move about by its innate power, while a cart is being moved by the pull of the horse. The horse is alive, the cart is dead, and the changes which we observe in purely physical nature are frequently interpreted to be movements not motions. But is this really the case?

The chemical combinations of atoms according to their affinities are active motions in which different elements join, not because they are pushed by a power from the outside, but because in their innate nature they possess a tendency to combine with definite other atoms, and one affinity is overpowered by another stronger affinity, so that atoms far from being pushed and passively pressed into combinations, are themselves actively pushing; they seek and flee each other under definite circumstances according to definite laws, which laws however are nothing but general formulas descriptive of the character of the atoms. The atoms are the actors in this case, and the laws of nature simply describe what the actors will do under definite conditions. We have good reasons to believe that the affinities of the various elements will have to be explained ultimately from the forms of the atoms.

We will here incidentally remind the reader that the name "laws of nature" is really a gross misnomer. The laws of nature are formulas; they are descriptions, generalizations, or uniformities. They are called laws because formerly they were supposed to be enactments of a ruler,

they were thought to be the ukases of a czar, or the Good Lord's police regulations. But they are not laws superimposed upon the phenomena which they describe. The laws of nature do not compel things to act, but they are merely formulas of human invention, contrivances to characterize things, and to describe in general terms what certain things, chemical elements or what not, will do under definite conditions. The word "law" is an inappropriate term and has proved misleading because it suggests the idea that all things in the world suffer under the compulsion of an outside power, whereas in fact the several objects of existence do the acting themselves, and their acting is uniform under the same conditions. Things act, and the so-called laws of nature describe, they do not compel. Things act as they are, and they act of themselves in agreement with their own nature, not because there is a *vis a tergo*, a mysterious power that pushes them.

In the realm of living beings analogous conditions prevail; the cat will catch mice because that is her nature, and the bird of prey will swoop down upon the quarry, not because he is under compulsion, but because he is hungry and wants a breakfast. A thief will steal whenever the opportunity is offered, and an honest man will act honestly in accordance with his principles. There is no law nor any metaphysical agency, that forces them to act; they act in a special way, because that is their desire. All things will act according to their nature unless artificially interfered with, and it will be obvious that all motions are the expressions of the nature of things which move, while all movements originate by a transference of energy. The objects on which motions act are in a passive state; in their movements they suffer interference by an outside force. All *motions* are free, which means they result from the nature of the acting things; all *movements* are due to compulsion and both take place with mechanical necessity.

It becomes obvious that while there are movements in the world there must also be motions, for every movement is caused by a motion. Movements could never originate from themselves. The thing being moved suffers violence by another thing which does the active moving. Where a motion takes place there must have been a certain amount of stored up energy that is set free by some cause or other, and wherever there is a movement it must have acquired its momentum from a motion. Accordingly the ultimate start of the world in its simplest and most rudimentary beginning, must be due to a motion and can not have been a movement. Gravity can not be due to a push from the outside as Lesage tried to explain it. If however Lesage's interpretation were right, the pushing corpuscles would be the actors endowed with an intrinsic power of motion. The ultimate cause of the start of the world process—if there was any definite start at all, if the world process is not eternal—may have been the contraction of the ether into molar matter, into atoms first of the lighter, then of the heavier elements, as we see them originate in some stellar nebulas. Assuming that this contraction is a commotion in the primordial world-stuff it will naturally cause movements by pull or push, and the whole world becomes a combination of motions and movements.

One difference between a machine and a living organism is exactly this, that a machine makes movements while an organism manifests itself in motions; but both are mechanical and the law according to which they move is in either case in rigid agreement with the mechanistic principle. Closely considered this means nothing more than that there are no haphazard motions but everything that moves is regulated in its activity by harmonious uniformity.

Schopenhauer declares that the fall of the stone is practically the same as the will of man, and we do not hesi-

tate to say that the will of man is an incipient motion accompanied with consciousness; it is a tendency in an organism to move, it is the decision to do a certain thing. The difference between an act of the will and the fall of a stone is simply this, that the stone moves purely by gravity, while the will of man is determined by a motor idea, by a thought of accomplishing a purpose; and this motor idea is a tendency within the man, not a pressure outside of the man. It is a push from within, not a pull from without, and since both the fall of a stone and the will of man are incipient motions, we can with a poetical license allow Schopenhauer's saying to stand that the stone has the will to fall; only the stone is unconscious, while a man in action is pushing consciously. In him the motor idea acts as much as gravity in the falling stone, and both act according to mechanical laws—the laws of motion.

In line with Schopenhauer's idea that gravity is to be classed together with the will of man, we may conclude that gravitation is inexplicable except on a teleological principle, that gravitating bodies have a certain will, that they are not driven, not passively pushed, but that they actively push with an inherent energy towards an aim, and we can not help thinking that in a certain sense this is true. At any rate we are inclined to regard gravity as a motion, not as a movement.

Among the explanations of gravity we see only one which seems tenable; namely that all matter has originated by a condensation of the ether, the ether being the original material from which the world has been knitted into a sense-perceptible form. Now if the ether is, as is generally assumed, a continuous and immeasurably elastic medium, and if atoms, or perhaps even their ultimate constituents, ions, or electrons, or whatever we may call them, are little whirls producing some condensation, we are driven to the conclusion that the ether surrounding every such

condensation is thinned out, and so every tiny whirl produces a tension all around its center—which tension, according to *a priori* considerations of the nature of space, must exert a stress in the surrounding ether on all other such centers of concentration in direct proportion to the amount thus concentrated and kept in tension (constituting mass) and the inverse square of their distance; and this fulfils the conditions of the Newtonian law of gravitation.

If this be so, all matter is but a form of ether, due to condensations accompanied according to mechanical laws, with attenuations causing the tension between the contracted portions. Matter would thus have originated through the resistance which the ether offers to a commotion whirling through its immeasurable ocean. Matter then would not be dead stuff, but must represent an active reaction, in which its latent qualities are set free, and gravity would be a motion, not a movement. It would ultimately be a strain between two or more centers exercising a pull, and this pull would not come from the outside but reside in the strained condition of the contracted ether masses.

The tension would neither proceed from the masses alone nor reside in them alone, it would prevail in the whole system. The cause of the origin of mass producing the tension between masses might be compared to a cramp in the ether. This theory presupposes that the whole world, the whole ether-saturated ocean of existence, is one great coherent system of whirls, and necessarily the state of strain in this immeasurable ocean of ether would be simultaneous, which means the strain obtains between two or more or immeasurably many centers of gravitation, and wherever there are changes through a changed interrelation the whole strain changes simultaneously. There is not a change at one end which is transferred to the other end; the entire state changes and affects both ends, indeed

all ends, at once. Hence we may expect gravitation to be a force which is simultaneous in its action; or in other words, gravitation does not take any time to travel from place to place.

We are driven to the conclusion by *a priori* reasoning that ultimately there resides in all reality, and indeed in every particle of existence, an active power which moves and asserts its own being according to the form of its nature. It stands to reason that such is the case, only we must bear in mind that an intrinsic and positive self-motion should not be regarded as arbitrary, but as conditioned by its own form and surroundings, which relations are mathematically determinable. The principle that everything is moved by a push from the outside, by a *vis a tergo*, and that all things are inert and are moved about in a passive state is unthinkable.

We see in the world-play a self-activity which must have been active from the very beginning, and we feel compelled to believe that the very simplest and most primitive, the primordial commotions which start the origin of siderial systems, must be intrinsically autonomous or self-moving. There is an innate tendency of motion, a *vis viva* as former physicists used to say, in all existence and there is nothing real that is not actuated by such an inherent power.

THE WILL.

In the world of human life there is a distinction similar to that in the realm of physics. The real active will is an incipient motion, but there are also movements; and by movements in the domain of organized life we understand the actions of those who are influenced by others, the people whose minds have been taken captive by a leader. It is a special art to guide great multitudes and inspire them with

a motor idea that may turn out to be a powerful event in human history.

It is sometimes just as difficult to distinguish between motion and movement in the world of life as in the world of physics, and so it happens frequently that the very leaders have received their impulse from others, from their predecessors. Here too it might seem at first sight that there is only movement and no motion whatever, for all motor ideas have been impressed from the outside; and on analyzing the most original leaders in the world's history we shall be able to trace the sources of their ideals. The exponents of world-movements are mostly the results of the movements which they lead, not their causes. A certain need produces a want. The want clamors for relief and grows into a demand and the demand finds a spokesman for reform. Mostly it is true that while we think we are pushing, we are being pushed, as a German saying runs, *Du glaubst zu schieben, und du wirst geschoben.*

Nevertheless what is true of the physical world is true of the world of human endeavor. All movement presupposes motion. There must be a source of active energy back of any passive movement.

What is superimposed from the outside by an extraneous influence is not the energy of a movement but its direction. There are great amounts of energy stored up in the multitudes of the people, and wherever there are reasons for discontent their minds become inflamed and they can easily be guided by promises and the expectation of the fulfilment of their hopes.

The presence of the will in the souls of men is not a theory but a fact, and those who have to deal with people in a practical way and in actual life know it and act accordingly. Therefore the teleological view finds defenders among men of a practical turn of mind. They take into account aspirations, intentions, hopes and fears; they lead

and direct them as they deem desirable; they scarcely investigate the nature of the will, but they know that it exists; they take account of it as if there were no hitch in an intellectual comprehension of the will.

According to the nature of different impulses historic movements are guided or battled against, suppressed or favored. Considering that this is a fact of experience, who will deny the existence of the will, of human endeavor, and other teleological phenomena? We need not hesitate to say that will and purpose are a matter of direct experience in the world of human life; or can we really declare that all our longings and desires are mere illusions? Can it be true that we imagine that we act ourselves while in truth we are acted upon by impulses as by a *vis a tergo*, just as the wheels of an engine are turned by steam? We answer that the will in man is no fiction; it is a real and actual force; it is the motor power in us, but it moves with machinelike precision. This may seem paradoxical, but it is not, and to explain this paradox is the main problem of modern thought; in fact this has been the great question of philosophy ever since science dawned upon mankind.

The main trouble rises from the great interests that are at stake. If man is a machine, or less figuratively spoken, if all his actions are mechanical, i. e., subject to the same laws as machinelike motions, does he not cease to be accountable, does he not sink to the lowest level of inanimate nature, and does he not lose his dignity as a man, as a creature developed in the image of God, an incarnation of the deity? This fear has bewildered even sober thinkers and produces an otherwise inexplicable confusion of thought, so as to excogitate on the most flimsy arguments theories of the nature of man as different from other creatures, so that man's actions are believed to be of a mysterious supernatural kind and not subject to the universal laws of motion.

We believe, and if we wish to be consistent we can not help believing, that all motions in this world, and in any possible world, move in agreement with the laws of motion. In other words, all phenomena of motion take place according to the mechanistic principle. This is really a tautology; motions are mechanical and the atoms of a brain move and can not help moving in a definite way prescribed by the laws of motion, just as a stone falls to the ground and as the comets sweep through the heavens in perfect agreement with the laws of gravitation. However this truth is not contradicted by the fact that every living being, and especially man, is endowed with purpose.

In the history of mankind all our movements of reform, all our life and almost every detail of intellectual activity is purposive. We make ideals and we follow them up, we fight for them, and we accomplish our aims or fail. We see in the whole world of living beings a new creation of intellectual aspirations, resting upon the purely physical domain of existence. Will is not a mere delusion but it is a positive and undeniable fact.

We have devoted much thought to the problem and have reached a definite, and in our opinion, a final solution. Here in the face of these two contrasts we will outline our position as briefly as we can.

THE NON-MECHANICAL.

We have always been careful to say that the laws of mechanics apply to all motions, and we add now that they do not apply to conditions, or states, or qualities of things and thoughts which are not motions.

The mechanistic scientist as a rule overlooks the truth that although all phenomena of motion are determined by the laws of motion, there are features in this world which are not motions. As such features we designate mainly the entire psychological realm of feeling, and in this realm of

feeling there lies the domain of mind, viz., the significance of feeling.

First of all, what is a motion? A motion is a change of place, and changes of place belong to the objective realm of bodily things. So far as we are bodies we move about, but so far as we consist of sentiments and thoughts, motion has nothing to do with the nature of our soul.

Now we will ask, what is feeling? One thing must be granted: Feeling is not motion and motion is not feeling. We can not by any amount of logical or dialectic somersaults derive feeling from motion, nor motion from feeling. Things which originate from combination can not possess qualities which are alien to the whole class. A machine can not move unless there is a source of energy, and an object can not have weight unless its parts are material. New qualities originate, but they originate by combination and according to the laws of form. In Buddhist philosophy such structures are called in Pali *Sankhāra*, and in Sanskrit *Samskāra*, which has been quite properly translated in German *Gestaltung*, and in English "conformation."

The disparity between motion and feeling was recognized very clearly in ancient India in both religions, Brahmanism and Buddhism. The truth that motion is not feeling, and feeling is not motion, is explained by the example of a lame man and a blind man. The two go traveling together, the blind man with sound limbs (representing motion or objectivity) can move about and he takes the lame man (consciousness or subjectivity of feeling) upon his shoulders to direct him in his motions. Neither could travel by himself alone, but the two together mutually serve each other.⁴

From such considerations of the disparity between motion and feeling modern thinkers (I mention here first of

⁴ *Visuddhimagga*, Chap. XVIII. Subjectivity is called "name" and objectivity "form." Both together (called "name-form" or in Pali *namorūpa*) constitute the personality of man.

all Clifford) have, quite independently of the philosophers of ancient India, come to the same conclusion that feeling can not have originated from either matter or motion, but its conditions must have existed in a latent state in the nature of existence from the beginning. In other words, matter can not be merely the inert mass, and motion the dead change of place they appear upon superficial observation, but must contain the condition of consciousness, the germ of life as it blossoms forth in sentient creatures.

Leibnitz called attention to the radical difference between psychic states and objective bodies. If we could look into a brain, and could have it magnified so as to be able to watch the cerebral mechanism, yea if we could have it so greatly magnified that we could walk into the nervous structures and trace the processes of thought, we would see particles jostling one another and the impressions received would be similar to those which we have when inspecting a mill or the complicated machinery of a factory, but we would see only motions of material particles, we would nowhere detect feelings, or thoughts, or sentiments.

And why could we discover not the least trace of feelings? Simply because feelings and sentiments and thoughts are subjective phenomena; they are inner conditions, they are states of awareness. What our senses can see and observe and recognize are only objects and objective processes, and these processes will always present themselves as matter in motion. If a guide accompanied us through the factory of a human brain, he might tell us what the different functions accomplish. Let us assume that he would say, "Where the machinery begins to glow and emits a dim light, the activity of the jostling particles acquires awareness, and in yonder place where this glow accompanies the motion that starts the machinery of certain muscles, there are the operations of purposive will." In this way we might learn to decipher the meaning of the

several motions, but for all that we would neither see will, nor awareness, nor purpose.

Meaning is the most subtle quality with which feeling can be endowed and just as other feelings are impalpable and invisible, so meaning can never be an object of sense. If we read a book we decipher the letters and the words. The printed letters are symbols which reveal their meaning to the initiated, but the meaning itself is not a material nor a mechanical quality, and therefore by no chemical analysis of the paper or the printer's ink could the least trace of the meaning be discovered. Mind alone can decipher meaning in the symbols which it ensouls.

The physical phenomena which we observe in the objective world are objective, but feelings are subjective, and thus we must recognize that objective existence is not all of nature. There is another aspect which is the psychic side of it, the inside of things; and this inside, this subjectivity of existence, furnishes the elements from which under given conditions feelings originate.

These two features, feeling and motion, have sometimes been described as parallel to each other; and sometimes feeling has been called an epiphenomenon of objective reality; and again the two have been treated as identical, as one and the same thing, either with a spiritualistic or a materialistic tendency.

If the argument of the parallelism of feeling and motion is reliable, we must assume that on the one hand every objective existence possesses a subjectivity of its own, however low it may be in the purely physical domain; that on the other hand every subjective state has its objective realization, and the two correspond exactly, for they are the two aspects of one and the same thing, as are the inside and the outside of a curve. We look upon them as not the same but as inseparably belonging to each other, as analogous, as two different aspects of one and the same reality.

In a perfected state of physiology, we may be able to trace the transformations that take place in cerebral processes, and thus we may, on inspecting the commotions in the brain, mechanically explain how one feeling originates after another, and how the same forms of cerebral activity are associated with the same kinds of feelings, but we have no means of explaining mechanically the nature of feelings. The ophthalmologist for instance may trace the different states of color sensations, but on the one hand he will find no trace of the idea of motion in either red, or green, or yellow or other color sensations, and on the other hand the various forms of motion in the ether waves contain nothing of feeling. There is a correspondence, but the two corresponding sets are intrinsically different. We have a combination and also a cooperation of the lame man who can see and the blind man who can move. The former apperceives, the latter moves. In the domain of psychic phenomena, the mechanistic principle is checked, for mechanicalism can not trespass on grounds which in themselves are not motions. But for all that we can range the two sets of phenomena, the subjective states and the objective processes, in parallel columns side by side, and if the lame man can not walk he can *direct* the steps of his blind associate.

We will illustrate the situation by comparing the brain to a book. The spirit of the living brain consists in the meaning which the several feelings possess, and the spirit of a book is of the same kind. Meaning is an impalpable something; it is neither material nor mechanical, yet it is the main portion of a living person and of a book. Meaning is, as it were, the stuff of which spirit consists. Meaning is a factor in life the import of which consists in its tendency to signify and classify, to denote, to explain, to impart direction, to guide. The vehicle by which meaning conveys itself and renders interaction between two or more

minds possible is the symbol. Symbols stand for something; they are representative; they possess meaning, and the soul is a system of sentient symbols. There is nothing mysterious in the representativeness of symbols and yet the whole domain of spirituality rises from meaning; from this non-material, non-mechanical, non-quantitative, intangible phenomenon of picturing something else. Analyze a book, you can not discover its meaning in the most minute products of the analysis in the chemist's crucible. Dissect the brain of a man, you will never find his soul in the dissected parts. Measure all the motions of the nerves by the most delicate reaction apparatus, you will never lay bare the feelings themselves and still less that most subtle thing, the significance of feelings. We can measure everything that is objective, even the intensity of nerve reactions, but we can not measure what is not quantitative; we can not measure the qualitative values of subjective states.

TIME AND SPACE.

If a sentient being has developed into a thinking being through changing its sensations into representative feelings, it will in the course of time through the regularity of sensations acquire an expectancy of other feelings which will follow in a normal and consequential course, and thus the regularity of events due to the uniformity of natural phenomena will produce an anticipation of the future. Night always follows day, winter follows summer, and the succession of events is regular in innumerable other respects. Thus a living creature even at an early stage of its evolution gains the power of prognostication; it will form an idea of future events, and will naturally adapt itself to their arrival in a purely mechanical way.

We must insist, however, that an anticipation of the future is a thought which exists in the present. It is not the morrow which shapes the present, as says a prominent

teleologist,⁵ but it is the *thought* of to-morrow which influences our action in the present. The thought of to-morrow has reference to the future, but under no pretext can we say that it belongs to the future, or that it takes place in the future, or that it is the future itself. It is based upon the past, and is part of the living present. The past is not dead, but is continued in all its efficacy in the present. It has shaped the present, lives on in the present, and the anticipation of the future is an outcrop of past experiences. In this way future events in a purely mechanical way cast their shadows before them, and thus purpose can and does originate in a mechanical universe.

The character of time is the succession of events, and the order of succession makes measurement possible. Measurement is a mental tool, invented for the sake of determining duration. The duration which is needed for the change from one event to another is expressed in units of time. The actuality before us is experience, i. e., events, transformations, successive changes, and the measurable duration of these successive changes is presented in our mind as time. Time, accordingly, the method of perceiving and determining duration, is ideal, while duration, the process to be measured by time, is actual.

The adjective "ideal" means partaking of the nature of ideas, implying that it is not an objective thing, but belongs to the realm of abstract thought.⁶

Time is only one abstract notion derived from the actuality of our experience, the other purely formal notion of objectivity is space. Space is in every respect analogous to time. Time is ideal, so is space. As time is eternal, so space is infinite. As time is constituted by the successive moments of motion and implies the possibility of meas-

⁵ Prof. W. B. Smith in his article published in *The Monist* for January, 1913, p. 33.

⁶ What is "ideal" need not be purely subjective. Compare the writer's book *Kant's Prolegomena*, pp. 186, 206, 214 *et passim*.

uring duration, so space is the field of motion and space yields us the opportunity of measuring distances. Time is as empty as space. Neither time nor space are concrete entities. They are not objects, not things, but relations, space being the juxtaposition of things and time the sequence of events. They are potentialities of action, and being potentialities they possess no limits, hence we call them infinite and eternal.

Schopenhauer looks upon time as that something which moment for moment renders futile everything under our hands. Time and the transitoriness of things frustrate all existence, and so time constitutes the vanity of all things. Schopenhauer says (*Parerga und Paralipomena*, II, § 143) : "What has been, no longer is; it is no more than what has never been. But everything that is, in the next moment has already been. Therefore the most insignificant present has an advantage in its reality over the most important past, to which it stands in the relation of something to nothing."

This view is ingenious and sounds like a profound truth too true and too well known to deserve a restatement, and yet Schopenhauer misunderstands the nature of time. He looks upon time as an infinite series of isolated moments. Some of these, the past, are dead; they have existed but exist no longer and will never exist again. Others, the future, are not yet and never will be. Only the present, hovering between the two, is actual, and this present is vanishing under our hands. It has just come, and the next moment it will be no longer. Thus all is vanity.

Schopenhauer continues: "We enter existence suddenly to our own amazement after not having existed during countless millenniums, and after a short time we have as long a time again not to be. This is not at all right, says the heart; and even in the crude intellect a presentiment of the

ideality of time must arise from considerations of this kind."

Perhaps the heart is right in another sense than Schopenhauer means. His idea of the ideality of time is metaphysical. It implies that the present which is constantly vanishing is not real, but that some non-temporal eternity beyond time and space contains true existence. This is Plato's conception and it is true enough if it is understood as a poetic and allegorical representation of a great truth. But Schopenhauer, in looking upon the moments of time as separate items, draws a conclusion which Plato would not have endorsed. Schopenhauer declares that the past is gone as if it had never been. If that were true, why does the thoughtful man consider the future? Why does he not live exclusively in the present and enjoy the passing moment? Why should we trouble our children with school and the tedious work of their lessons? The truth is that the work done in the past is not gone as if it never had been, but remains with us, in the shape of blessings or curses. For the past is not dead; it lives on in the present and will continue in the future forever afterwards.

Like so many others, Schopenhauer forgets that the three aspects of time, past, present and future, do not consist of disconnected moments, that the three are one. He descants on the doctrine of the non-existence of the past and the illusory existence of the future, saying (§ 144): "Our existence has no basis nor ground on which to stand except the vanishing present. Thence it substantially has the constant movement towards assuming form without the possibility of the rest for which we continually strive. It is like the course of a man running down a mountain side who would fall if he tried to stop and can keep his footing only by continuing to run; likewise it is like a stick balanced on the fingertips; it is like the planet which would fall into the sun as soon as it stopped hastening uninterruptedly on

its way. Hence unrest is the type of existence. In such a universe where no stability of any kind and no permanent condition is possible, but where everything is seized in a restless whirl and change, where everything is hastening, fleeing, holding itself upright on the tightrope by constantly marching and moving, happiness is not in the least conceivable. It can not dwell where Plato's 'constant becoming and never being' may alone be found. First and foremost, no one is happy, but each strives his whole life long after a so-called happiness which he seldom attains and then only to be deceived; generally, however, each one finally puts into port shipwrecked and unrigged. But then it makes no difference whether he has been happy or unhappy in a life composed merely of a transitory present which is now at an end."

While it is true enough that restlessness is the type of existence, it is not true that it makes no difference what a man has done or experienced in life, whether he was happy or unhappy, whether he accomplished something good or evil; for we repeat that the past is not absolutely dead and the several moments of our life are not disconnected items which are gone as if they had never been. For the past endures in the present as a living factor, and the present continues in the future.

There are not three separate times: past, present and future; there is one time: it is eternity, for eternity lives in the unfoldment of time. The past is not eternally dead, the past dominates the present, it has formed the present, it continues to live in it and constitutes its character; the future is not, as has been claimed "never here"; the future is the present in its becoming, it is the living foetus in the womb of time; it is its bud before a full unfoldment. Like the past so the future is an essential part of the present, and in this way the Janus-headed time constitutes a trinity which is an indivisible unity with three aspects.

Time is the ever living present with one face toward the past, the other toward the future. We insist on the unity of time, to show that there are not three different kinds of time, one eternally dead, the second eternally dying, the third one forever and aye still-born. The past is the factor, the future the product, and the two touch in the present when the factor determines the product. The present in its connection with past and future is time, and time is eternal.

Among the best contemplations on time and space are Schiller's verses:

TIME.

"Threefold is the march of Time:
 While the future slow advances,
 Like a dart the present glances,
 Changeless stands the past sublime.

(*Time as Future.*)

"No impatience e'er can speed him
 On his course if he delay.

(*Time as Present.*)

"No alarm, no doubts impede him
 If he keep his onward way.

(*Time as Past.*)

"No remorse, no incantations
 Alter aught in his fixations.

(*Application.*)

"Wouldst thou wisely, and with pleasure,
 Pass the days of life's short measure,
 From the slow one counsel take,
 But a tool of him ne'er make;
 Ne'er as friend the swift one know,
 Nor the constant one as foe!"

SPACE.

"Threefold is the form of Space:
Length, with ever restless motion;
Seeks eternity's wide ocean;
Breadth with boundless sway extends;
Depth to unknown realms descends.

(*Application.*)

"All three types to thee are given:
 Thou must onward strive for heaven,

Never still or weary be
 Wouldst thou perfect glory see;
 Far must thy researches go
 Wouldst thou learn the world to know;
 Thou must tempt the dark abyss
 Wouldst thou life's deep meaning wis.

"Nought but firmness gains the prize,—
 Nought but fulness makes us wise,—
 Buried deep, truth ever lies!"

(Translation by Bowring.)

CAUSALITY.

Time and space are the ideal aspects (or to speak with Kant, they are pure forms) of the real processes which we observe in experience. The order which prevails in these processes is called causation and the law of causation is causality. The problem of the evidence for the truth and the reliability of causality was first proposed by David Hume who doubted the necessary connection between cause and effect.

Hume proceeded from the sensationalist school of England and claimed that we observed constantly repeated concatenations of cause and effect, but he denied that a succession of cause and effect, if experienced ever so often, was any proof that in the future also the same succession would take place. So he turned skeptic, but he deemed the probability of the constancy of this connection sufficient to accept a belief in causality as a working hypothesis.

It is well known that Hume's skepticism set Kant to thinking, and he discovered that the certainty of our notion of causality is of the same nature as the certainty of mathematics, which means that it is purely formal. Accordingly he considered it an *a priori* truth as much as all other purely formal theorems—arithmetic, geometry, logic and pure nature-science. Kant took an inventory of our *a priori* knowledge which he discovered to be the condi-

tions of all experience and denoted them as transcendental.⁷ All the store of our transcendental knowledge constitutes the possessions of pure reason.

We have come to the conclusion that Hume's conception of causality is wrong. Hume speaks of cause and effect as two "objects" that unvaryingly follow one another, and he was unable to find any reason why this should be so. We see in cause the initial start and in effect the final state of a certain event or process of transformation, and in this respect causality is identical with, or another aspect of, the law of the conservation of matter and energy. It is a purely formal statement, or to use Kant's nomenclature, an *a priori* doctrine, just as much as any arithmetical or geometrical statement, or as the logical principle, A = A.

The law of causation means that the sum total of existence remains the same. The sum total of energy and substance⁸ of yesterday is the same as it is to-day and will be to-morrow. In other words, all changes that take place are due to motions, and every special case of causation which we investigate is contained within a certain field of observation; it is a mere change of form, a change of position, of configuration, of combination, of interrelation. There is first the initiative motion which enters as a disturbing factor and upsets the state of affairs in a given

⁷ Kant's term "transcendental" has been the source of much confusion. By "transcendent" Kant understands what transcends our comprehension, what lies beyond it, in a word "the unknowable." Transcendental, however, is that which transcends experience as its condition. Pure logic is transcendental, mathematics is transcendental, space and time are transcendental. Logic is the condition of thought, and our notions of space and time are a transcendental esthetics—viz., the conditions of our senses, of our viewing things as objects in space and time. In Kant's phraseology, time and space are the forms of our *Anschauung*. (See on *Anschauung* the writer's *Kant and Spencer*, pp. 75-80). Things-in-themselves are according to Kant transcendent, but the purely formal sciences are transcendental. A belief in the transcendent is mysticism; but the realm of the transcendental is the arsenal of science; the transcendental furnishes us the methods of clear thought.

⁸ We say "substance," not "matter," on purpose, for it is quite probable that matter is a form of ether, having originated as mass through the ether's resistance to energy.

system, viz., in our field of observation. We call it cause, and we trace the successive transpositions of parts, of the several portions of the system, until a relative rest is regained; and this new state of affairs, the final outcome of this transformation, is called its effect or the result.

Causation accordingly is a law of motion and every process of causation is necessarily mechanical. If all details were known, we could see in every single case how one change of place upsets the equilibrium of a state of things and leads to other changes of place. A cause which is not mechanical does not exist.

The reason why a cause may or must be efficient need not be mechanical, it is always a matter of form, viz., of arrangement, of configuration, of disposition, of structure. The cause itself produces its effect according to the laws of motion, but different arrangements, like different positions of a railway switch, impart to a motion different directions, and since different configurations in the domain of cerebral activity are ensouled with different meanings, the non-mechanical enters as an important factor in the world of mechanical events.

We have explained again and again the processes of causality as a transformation, yet the old traditional errors die hard and are still adhered to even by our friends who ought to be familiar with our work. Prof. William Benjamin Smith of Tulane University still continues to speak with Hume of cause and effect as "following each other"; yea he out-Humes Hume by declaring⁹ that "they do not touch hands." If he had understood our view of causation he would know that they *do* touch hands, for they are not two things following each other, but the two together constitute one indivisible process and are two features of it,

⁹ See Professor Smith's article "Push? or Pull?" in *The Monist* for January, 1913, p. 22.

the cause being the initiative motion, the effect the final state of one and the same process of transformation.

Hume speaks of cause and effect as two "objects following each other" and he finds that they have nothing to do with each other. He speaks of "strychnine" as "a cause" and "the dead mouse" as the result, and then he wonders what these two heterogeneous objects—strychnine and a dead mouse—have to do with each other. Naturally he is puzzled and grows skeptical. Had Hume contemplated the whole event as one process of which the cause would not be strychnine, but the eating of the strychnine, he would have seen how this initiative incident of transporting the strychnine into the stomach, affects the intestines and must result in the death of the mouse. If he had thus treated his problem he could not have doubted the connection between cause and effect. But he singles out two objects which are connected, the one with the cause, the other with the effect, and is puzzled.

What grievous mistakes such an unusually keen thinker can make! He shows his acumen by finding the problem and stating it, but in the attempt at solving it he fails most lamentably. Kant caught the right scent, he recognized the character of causality and classified it correctly with other purely formal notions. He diagnosed the case, but he failed to explain Hume's trouble. He proved that sensationalism was untenable, but did not cure the disease of skepticism, and he tinged philosophy with idealism by tracing the idea of causation back to the constitution of the human mind without investigating the origin and development of mind.

We see in causality a law of transformation, and we understand thereby not only the reliability but also the intelligibility of a necessary connection between cause and effect. We understand it to be based on the law of identity, and thus Kant is right to regard it as *a priori*. Noth-

ing has newly originated, neither substance nor energy; nothing has been lost. All we observe is a change of form, and it is the business of the scientist to trace the several stages of the process and to understand how one change of form gives rise to other changes.

We insist that causality being the law of transformation must be mechanical; it traces changes of place which follow successively step by step. Every prior change of place is the cause of the following one in a continuous concatenation; and the explanation is complete if we know in every detail how matter moves in space.

A general description of the essential features which make a cause effective is called the "reason," and the reason which is an answer to the question why certain results are produced is commonly called a law of nature. Reasons may refer to conditions which are not mechanical, but, for all that, causes remain motions, and while reasons may be logical, or geometrical or draw upon other non-mechanical domains to explain the efficiency of causes, the latter will remain mechanical.

A cause is always an event. It is a motion, a definite occurrence that takes place in a definite spot of space and at a definite moment of time; and it is a grave mistake to say with Hume that the cause is an object. Strychnine is not a cause. The eating of strychnine is a cause while its destructiveness of living tissue in any stomach is the reason of the effectiveness of the cause. The bullet is not the cause of a man's death, as Hume has it, but the vehement entrance of the bullet into his body is the cause of a laceration of his vital organs which results in death.

The whole process of causation is always mechanical and takes place according to mechanistic principle, because every transformation means change of place (motion) and a rearrangement of parts. This general law holds good for the simplest purely physical process as well as for the trans-

formations in the brain of a thinking man. There is no other way of thinking out clearly the meaning of causation.

Kirchhoff established a new conception of mechanics in his famous dictum that mechanics *describes* motions in the simplest and most exhaustive way, and it is noteworthy that he omitted in his definition the traditional term "cause." He no longer says that mechanics searches for the cause of the motions, but he simply says it "describes the motions." This strange procedure of Kirchhoff is obviously due to the metaphysical and erroneous conception which obtained in his days of the term "cause."

There has been much talk about different kinds of causes, as efficient causes, final causes, ultimate causes and a first cause, the latter having been identified with God as the cause of himself (*causa sui*); but this conception of the word "cause" rests simply on a confusion of "cause" with "reason." While causes are the incipient motions in a process of transformation, reasons are the general formulas which describe how certain causes take effect. Reasons may be more or less general, and we may consider a universal statement as the ultimate reason of a certain set of happenings. Causes are always concrete and definite; reasons are always abstract and general; causes are always mechanical in their actions, reasons are always argumentative or logical or explanatory.

The confusion between cause and reason has given rise to many errors in the domain of philosophy, and sometimes also in the heads of scientists. One of the worst errors is the belief in mysterious metaphysical causes which are assumed to live behind natural phenomena and account for them like the laws of nature with the notion lurking in the word "causes" that they, these metaphysical causes, are mysterious entities which have an existence outside and beyond the actual world in mystic domains as a transcendent extra- or super-natural essence. Kirchhoff misunder-

stood the term "cause" in this sense and so he denied the existence of causes.

If we properly understand the law of causality to be a law of transformation ultimately based on the theory that no change is due to the sudden appearance or disappearance of anything real, be it matter or energy, but that all processes are mere changes or transpositions of parts, and that new creations arise by a combination of particles in new forms, we shall see that the law of causation is a mere corollary to the mechanistic principle, and thus causality is in Kant's terminology an *a priori* truth corresponding to the logical law of identity. It means that nothing comes from nothing, and no reality, neither matter nor energy, can disappear into nothing. All that happens is transformation and is due to change of place.

It is obvious on the basis of this consideration that every portion of the causal nexus of events must be mechanical, which means that the mechanistic principle applies without any exception to all causes, and nothing is actual unless it is matter moving in space.

If this is generally true we must assume for instance that chemical processes must be regarded as due to molecular mechanics. On the other hand we know that reasons are general formulas; that they are ideas, not changes of place; that they are notions, not motions; and we must grant that the logical factors of our thought are neither matter nor energy and, as thoughts, have nothing to do with motions; nor can their explanations be derived from the mechanistic principle. How could we prove from mechanics the mortality of Cæsar which logic derives from the two premises, first from the universal law that all men are mortal, and secondly from the particular statement that Cæsar is a man? We prove logical statements by logical syllogisms.

THE SIGNIFICANCE OF FORM.

How then does the non-mechanical of the subjective domain of existence, our thoughts and ideas, enter into the mechanical world of objective reality, and how does the subjective aspect of organized beings influence the causal nexus of life? The fact is obvious that this is done, for our very existence as purposive rational creatures proves it, and the influence of the subject on the object is exerted in the same way as the subjective factors rise from merely potential existence into actual being.

Mentality originates by the representativeness of feelings. Symbols are the conveyers of meaning, and meaning is the quintessence of spirit. Where there are symbols there is spirit, and symbols possess definite forms; forms however are common to both spheres of existence, the subjective and the objective realms, for definite kinds of feeling correspond to definite forms of activity or of bodily appearance. In order to communicate a meaning we can do it only by a communication of symbols, by acoustic symbols or words, by written characters or letters, by dots and dashes in telegrams. But without symbols there is neither spirit nor the communication of meaning. The printing of a book or the writing of a letter will illustrate the important truth of the spirituality of the symbol and the non-materiality of spirit. The meaning conveyed in words, spoken or written, must find expression in objective symbols of a definite form, in air waves or in inky figures, but the meaning is neither the energy of the air waves, nor the ink of the written character. The meaning is qualitative, not quantitative; it depends upon the form of the characters used, not on the amount of energy or matter needed to produce the symbol, and form plays an important part in mechanics.

Difference of form means a difference in the factors

that guide a discharge of energy; the relationship of things imparts direction. The energy of steam in a boiler makes the engine go, but the position of the switch determines its direction. Our thoughts are sentient symbols which reside in definite forms of our brain structures, and these brain structures are efficient and transfer their activity according to their forms and the established associations in the nervous system. They determine our actions just as the cogs and levers of a machine will work in one or another way according to their construction, i. e., according to the form in which they are made and the relative positions in which they have been set.

Apparently form is the essential thing everywhere. Matter and energy are merely the material of which the cosmos is built, but the cosmos itself, its orderly realization, is in its form; the forms of existence make it what it is. Matter only renders things real, energy makes them actual, but form constitutes the essential feature of existence and contains its character. The possibilities of formation are inexhaustible; they are infinite, and for them there is no limit of perfection. All things are forms produced from the same aboriginal material; we ourselves are forms, and the form of our subjective nature, of our souls, possesses meaning. This meaning of our soul-forms is thought, it is mind, it is spirit.

At the start of the world-process the purely physical qualities of existence alone manifest themselves, but in the course of evolution life, sentiency, and thought develop, and every step forward is taken according to mechanical law. Such steps are: the origin of organized life as metabolism; the process of the preservation of form in the flux of organized life which is the base of memory; the origin of feeling by an organization of subjective states which is accomplished by the growth of a nervous system so as to enable an isolated feeling to come in contact with other

feelings, whereby feelings become conscious; the origin of mind which takes place when feelings acquire meaning; the classification of sense-impressions according to their physiological forms whereby automatically a logical system of genera and species is built up; also the development of language as the vehicle of abstract thought. Every one of these several phases in the development of the human mind is strictly mechanical; every one of them has originated in a mechanical way and finds an explanation of its mode of functioning in the basis of the mechanical principle.¹⁰

THE SELF-REALIZATION OF POTENTIALITIES.

There have been thinkers who on the ground of the mechanistic principle assume that the world must have some originator, a first mover, who is responsible for all the motions that take place, and especially for all that is good and noble in the world. His mental forethought must have determined the procreation of the world in all its details and especially in its final outcome or in the climax of its evolution, and the argument of this view is commonly and popularly formulated in the saying that the stream can not rise higher than its source.

This popular statement would make it quite plausible that in the evolution of life, the highest must be at the beginning, and the height of the beginning can never be reached during the process of life's history. But this need not be so; in fact it is not so. While nothing new can be created so far as substance and energy are concerned, there is decidedly a creation of new forms. The combinations that are possible contain not merely additions of parts, by external associations, but we meet also with fusions resulting in absolutely new things, possessed of new qual-

¹⁰ Compare for a brief synopsis of these problems the author's pamphlet *The Philosophy of Form*.

ties, and this is an important truth which is frequently overlooked.

While the stream can never rise higher than its source it increases in size and in the capacity of being useful, and the lower it goes, the larger it grows. The source could not carry the pageantries of the world which the river accommodates in the harbor where its waters empty into the ocean.

It is not true that the primitive substance, the aboriginal world-stuff, must contain the seeds of all the possible creatures or things which come about by combination. A steam engine does not lie hidden in the iron of which it is constructed, nor is an organism contained in the molecules which constitute its parts. New combinations will produce new qualities which are absolutely absent in their component parts.

This is true not only in physics but also and primarily in the realm of pure thought. Kant investigated the problem of *a priori* synthesis. He asked whether or not *a priori* synthetic judgments are possible and he showed that the simplest arithmetical addition is of a synthetic nature, as for instance the statement $5 + 8 = 13$. The nature of the number 13 is not contained either in 5 or 8 but is something new, and the same is true of all the results in the domain of any of the purely formal sciences.

We do not evaluate mathematics from a mysterious geometry in and by itself, but we construct mathematics with the help of the elementary mathematical notions. When we make two lines cross each other in a plane, we produce an angle; and an angle is radically different from a line, being the inclination between the directions of two straight lines which is not contained in, and can not be explained from, the definition of the nature of straight lines. The same is true of triangles. The nature of a triangle has no more been deduced from straight lines

than has any other figure of geometry. We build up absolutely new and more and more complicated notions by making new combinations.

The same is true in objective reality, as for instance in chemistry. The chemist distinguishes carefully between chemical combinations and chemical mixtures. In a chemical combination different kinds of atoms are so fused together as to produce a new unity with new qualities. And with every advance of evolution new phenomena are created.

Some of the life processes can definitely be proved to be the same as other mechanical or purely physical or chemical processes, but we can not for that reason concede that life is throughout merely chemical or explicable by molar mechanics alone. Bio-chemistry has made great strides, but it will never be able to break down the barrier between chemistry and biology. There are certain features in the biological processes which are typically biological and can not be discovered in the realm of inorganic chemistry. Such processes are, for instance, the circuit of life known as metabolism, and in this constant flux the preservation of life-forms which furnishes the condition of memory, and assures the possibility of self-preservation (which is a preservation of form in the flux of metabolism) against the leveling influence of the surroundings.

There are everywhere phases of transition, but sometimes a slight modification creates the rise of a new kind of phenomena which as soon as perfected after a long preparation will show a great contrast to all other occurrences. Such a contrast originates in the appearance of animal life.

The gap between life and inanimate nature is even more marked than the gap between molar mechanics and chemistry, for in animal life we reach a new stage which displays the wonderful phenomena of sentiency. All the

processes in the domain of life are and must remain ultimately mechanical, but their mechanical nature is so complicated, much more complicated than the molecular mechanics of chemistry, and presupposes such new combinations that the life processes possess a character of their own. Under these circumstances we are justified in distinguishing between the various classes of phenomena and assigning to the different sciences domains of their own. There are other features present in vital phenomena which are absolutely absent in purely physical events, and among these features there is in animal life the appearance of consciousness and with it the rise of the will which means purposive motions. This feature increases with the progress of evolution and becomes so obvious that it may be considered as the characteristic quality of soul-life. A denial of it will prove vain, for the fact remains; and since the pursuit of purpose is so prominent in animal life, we may describe man, who has climbed to the top of self-consciousness, as the climax of purpose-pursuing animalhood.

The potentialities of existence, all the possible combinations of things or creatures which may or will originate in the course of evolution, exist in a latent state in the domain of pure form. They are mere applications of the eternal laws, so called, of the factors which direct evolution and constitute the world order, the divine dispensation which shapes the *telos* of the world, its aim and end. They are what Goethe¹¹ in reference to a passage in Plutarch¹² calls the mothers whose habitat is in the field of truth, a place not to be found in space, who move in a time which is above the distinction of past present and future, and breathe the air of eternity. These mothers are like the Platonic ideas and the matrices of Paracelsus.

¹¹ In *Faust*, Part II, Act I, Scene 5.

¹² *De defectione oraculorum*, 22.

The potentialities of existence unfold themselves according to the eternal laws of the cosmic order from the latency of non-existence into the actual life of self-realization.

The development of the world, with all the life it brings forth and the moral aspirations of rational beings, rising from the mere potentiality of existence into the nobility of a purposive thoughtful man, may be called the self-realization of God, of that eternal norm which dominates all that is, that ever has been and ever will be, of that which in its potentialities is infinite and inexhaustible. This norm is not material; it is purely formal. Nor is it an enormous amount of energy. Neither is it subjective or sentient; it is not a mysterious ego-consciousness; it is the formative principle of anything that might arise into existence; it is the potentiality of being, its law and the guidance of its formation. This norm is the eternal in the transient, it is the divinity of creation and the supernatural of nature. It is the factor that determines all things and it is He in whom we all live and move and have our being.

THE DIGNITY OF MAN.

There is no reason to decry the nature of man's mind as something low by pointing out that like a machine it works in a purely mechanical way. It is true that in this sense man is a machine, of course a living machine, but it is not true that his dignity is any way impaired by this truth, and this is an important point which ought to be discussed.

Man's dignity is not a question of fact nor of theory but merely of attitude, and yet it is for many reasons of great significance. This point, the dignity of man, implying also his responsibility for the actions he performs, is commonly treated as a side issue of the problem of the freedom of the will.

As we understand the situation we see nothing amiss in the truth that all happenings in the world, including the actions of man, take place according to the law of causation which is and must ultimately be mechanical. The intrinsic necessity with which all events take place does not mean a tyranny of some mysterious power called natural law. Necessity does not mean compulsion, and natural laws are not police regulations nor the ukases of a Czar; they are formulas summing up the essential features of processes; they are descriptions of what things or creatures will do according to their natures. The law of gravitation is not a force which drives the falling stone toward the center of the earth; it is a generalized statement of what masses will do and how they behave under given circumstances. And in the same way there are laws of a dynamics of the human will, according to which we can foresee and foretell how people of a certain character will act. An honest and noble man will in his pride and self-esteem prefer to drink the cup of hemlock rather than to slink out of the prison or cringe before his infamous judges with cries for mercy; and a villain will not shrink from theft or corruption or crime, but will be bold in action; he will not hesitate to be unscrupulous in his self-assertion.

Freedom of the will has often been doubted, but if there is no free will there is no will whatever. Every will is free, if it be will at all. Will ceases to be will if it is suppressed. Will that is not free can not act in accordance with the character of the willing person. Free will is synonymous with will.

Freedom of will means that people act, not arbitrarily, but according to their own nature without compulsion. If we know the nature of a person we can predict what he will inevitably and necessarily do under given circumstances, and prediction does not imply a suppression of

liberty. On the other hand the necessity with which free people act according to their nature does not mean that their will is unfree or that they are slaves—slaves of their own nature, subjects of their own will.

In Mark Twain's exposition,¹⁸ the weakness of this theory that the will is not free comes out very plainly. Mark Twain claims that every man has in him a stern judge whose approval must be won, a tyrant and master who must be obeyed. We are our master's slaves. But who is this inexorable tyrant? It is our ego, it is the exponent of our personality; it is that which says in us *I*, it is the brain structure which pronounces a decision of our will, the final result of a deliberation of our wishes and fears and considerations. In a word this tyrant is we ourselves.

It is true enough that we can not help being what we are. A diamond is a diamond while grains of sand are common things, and they are what they are because the history of their origin and the circumstances under which they were formed made them so. A man is noble or vulgar because he has developed in this or that way. Nothing is what it is on its own account, or can claim any merit of its own. Nevertheless we esteem a diamond more highly than quartz crystals and we appreciate good qualities of human character. Our appreciation, however, should not exclude the recognition of the divine beauty that lives in the most common things in the snow crystals no less than in diamonds.

In all of us the cosmos lives. Everything has shaped itself in the mighty forge of existence, but there are different forms and they are by no means of equal value. Our past dwells in us as a living presence; it has made us what we are to-day, and quickens us in our actions. We are what we are because this is what under former

¹⁸ See the article on "Mark Twain's Philosophy" in the present number of *The Monist*.

conditions we wanted to be. Our past actions, our former doings, have shaped our character as it is now.

Man possesses a dignity peculiar to himself. It consists in having reached a comprehension of himself. He has learned to judge his own will, he can approve his volitions, he can condemn them and he can form ideals. He can form a conception of what he wishes to be and this conception of his ideal self becomes a factor in his life. He can grow beyond his present self, he can improve. Rückert, one of the most thoughtful German poets, says:¹⁴

"The type he ought to be
Each one bears in his mind.
Until that be attained
He never peace will find."—Tr. by P. C.

Man establishes principles of action, to will or not to will this or that. According to conditions he either follows his principles or is remiss in his obedience to them, but in every case his own will plays a significant part in the development of his character, and it is therefore quite justifiable to hold him responsible for his actions. The feeling of responsibility and our neighbor's opinion of our responsibility are factors in our lives which strengthen our good intentions, while the idea of irresponsibility acts like a bane that paralyzes the will.

A man is not responsible for his actions only if he acts under compulsion against his own will, if he is intimidated by some external power, either by direct violence or a threat—in brief, if he is not free. In such a case his actions are not a genuine expression of his character.

We must remember that there is a difference between necessity or determinedness on the one hand and compulsion on the other. Everything is determined, even the decision of a free will. The will of a free man is determined by the man's character. There is no sense in defining a

¹⁴ See the author's little book *Personality*, p. 7.

free will as undetermined or undeterminable or arbitrary. An arbitrary will would be the outcome of chance and as such it could have no moral value, no dignity, and would not convey any responsibility.

MAN'S DIVINITY.

Having come to the conclusion that man is a machine, Mark Twain was overcome by a great desolation because he saw the dignity of man dwindle away under the thought that man possesses no merit whatsoever. But what ground is there for dejection if man's actions really take place in accord with the mechanistic principle? Is man the worse that he is no exception to the common natural law, that his activity, like any other event in human nature, is subject to the law of causation? Even though the means by which nature, with the help of mechanical laws, attains her end to produce a rational creature be very simple, the fact of man's high standing in nature remains the same.

Here is the point which is of great importance, and which we wish to bring out. Man's divinity is not less divine because he has developed in perfect accord with the laws of nature; on the contrary, this very feature constitutes his divinity.

We understand by God "the authority of conduct" and the ultimate standard of goodness in the constitution of the universe. He who lives in agreement with the cosmic order is moral, he who infringes on it becomes alienated from the divinity of existence, and we must bear in mind that the laws of nature are ultimately mechanical. The laws of chemistry, of molecular mechanics and all other laws that regulate the order of events are simply applications in specially complicated fields. The simplest laws are not superseded in the more complicated conditions but expanded and specialized. The laws of social interrelations, of historic movements, of progress and evolution are not excepted,

and we do not hesitate to say that the multiplication table has more to do with justice and righteousness than a belief in special revelations or in mystical dogmas.

There is something holy about arithmetic and mechanics which would do us all good to appreciate. Any one who ventures into an investigation of mechanical laws will come to the conclusion that they present a grandeur of nature which is truly divine, a grandeur which shows a wondrous consistency and reliability, which always remains faithful to itself, which brooks no exceptions, and lies at the bottom of the grand cosmic order, so mysterious in its results and yet ultimately so simple. All the different happenings in the world are applications of the same universal principle, and all the differences of the various laws of nature are ultimately one and the same truth differently applied.

If we were omniscient we could trace the same mechanism everywhere in all happenings. We would be able to derive every special truth from the universal law of transformation by mechanical changes and predict what will happen under given circumstances even where we can have no personal or direct experience. The laws of mechanics give us a key to the riddles of all the events that happen in the universe, of the motions of atoms as well as the whirls of the galaxies of whole Milky Ways.

What is there mean or low in the domain of mechanics? How can we look down upon the harmonious order of all the moving bodies so as to make us feel ashamed of our own existence for partaking of this same disposition?

The dignity of man justifies us in speaking of the divinity of the cosmic constitution; and the grandeur of the cosmos justifies our belief in the dignity of man, for man is the highest creature of creation and in him we see the cosmic order reflected—or to use the language of religion, man is an incarnation of God.

Whether or not the transaction of the human will can be explained from mechanistic principles, the dignity of man remains the same, and as soon as we grant that man's appearance on earth is not due to an accident but to the proper working of natural laws, we grant that the rationality of man, which conditions his ability to adapt himself to the future, to direct his affairs, and to pursue plans, is a feature that has its counterpart in the cosmic order of natural laws, and the cosmic order is intrinsically characteristic of the constitution of the universe. All existence is dominated by laws, or better, it exhibits uniformities that render such an outcome, the procreation of rational beings, not only possible but necessary, and we can trace the progress of anthropogenesis step by step as produced by mechanical law.

What can there be unworthy in this truth?

THE UNIVERSAL AND THE PARTICULAR.

What surprises us mainly when we consider the worth of human personality is the particular, the peculiar, the individual character of every single man.

On the one hand we insist that all men are brothers, that we must respect in every individual person his humanity, those features which all men have in common, consisting in human rationality and the humanness shown in their superior morality which raises them above the level of the beast. On the other hand we notice that no two persons are alike. Every one works out an idiosyncrasy of his own, and while we respect the general feature, the humanity of man, as the basis on which we recognize him as a brother, we appreciate at the same time that particularity which constitutes his individual character, his unique selfhood, his particular personality.

A herd of sheep is to us a number of pieces of living things—of wool and mutton. We do not care for the in-

dividualities of the different sheep. We ignore their particular traits except in so far as they have a bearing on their marketable qualities, the tenderness of mutton or the softness of their wool. They are to us mere numbers of equivalent units that can be expressed in pounds, and on account of our indifference most of us are unable to tell them apart. One sheep is to us like the other, but in reality they are individuals and are by no means absolutely like one another; for all things in this world possess individualities of their own, even though we are ignorant of the differences and may not be able to appreciate their variations.

It is remarkable that snow crystals have been photographed in large numbers, and yet there have not as yet been found two crystals which are alike. Every one possesses its own individuality, and we may add, a soul of its own.

The general law according to which snow crystals form is universal. The law is the same under any and all conditions. Everywhere we observe the hexagonal type which makes the crystal grow at angles of 60° , but while the law is general the variety of conditions must be so infinitely illimitable that every single speck of vapor forms a crystal of its own making, which however to a gross observation will seem like all the rest on account of our indifference to their varieties.

It seems to us probable that the same will be found true in all things. If we could see before us the atoms of gold we might not be able to find two atoms which are exactly alike, while all of them would be expressions of the same general law. And further what is true of the smallest particles of existence will probably be true of larger aggregates such as solar systems and planets. If we could search the heavens we would find it difficult to find two planets which would show the same conditions in their general

formation, and probably also in the development of life on their surfaces, and yet all of them would be subject to the same law, and all of them accordingly would have some characteristics in common with the rest.

The universe seems to be a world of universal law, and at the same time of a particular individuality of detail, and it appears that the wonder of this world of ours is the infinite variety of forms in spite of the rigorous uniformity which we call law. There is a universal order and yet a liberty of individual self-formation.

Mathematical space is the same all through and yet every point in it has its own special place. Why should not every speck of existence in the real world possess its own particular quality?

THE DIVINITY OF THE MECHANICAL LAW.

We stand midway between the two parties, between the mechanistic scientist and the teleological thinker. We recognize rigorously the mechanistic principle as applicable to all motion, but for that reason we do not deny that there is purpose in the world. Purposive creatures develop with mechanical necessity and their appearance in the cosmic process is significant. We even grant that the development of the world has a definite direction, a *telos* or aim, but we can no longer conceive of this aim as the design of a demiurge, of a world-builder, who after the fashion of a man has constructed the mechanism of the universe as a watchmaker makes a watch, and lets it run in a mechanical way, now and then interfering with the mechanism by what mortals call miracles. The direction of the evolution of worlds, of planetary systems and of the development of life on the several planets, is not a contrivance of an all-wise creator, but is determined intrinsically by the divinely grand immanent order of consistency, which is the foundation of all the uniformities of natural phenomena.

Our aim is to establish a rigidly scientific philosophy. We recognize only those truths which can stand the test of scientific critique. Nevertheless our philosophy is not anti-religious as science need not be anti-religious. We are conservative, for we see in religion a phenomenon that develops as naturally and necessarily as human society, the state and other institutions.

The several religions, foremost among them Christianity, are instinctive attempts to attain the truth needed for practical life. It is natural that such truths have been formulated in mythological tales and in allegorical dogmas, and it is but fair to judge dogmas and myths according to their meaning. Belief in the letter killeth, and the truth of religion consists in the spirit of its doctrines.

Not the least valuable doctrine of Christianity is the idea of God, but even here we are confronted with an allegory. The highest efflorescence in the universe is man and so it is quite appropriate to represent God, the All-being, the highest and absolute authority to which we must conform, under the simile of a human personality, as a king or a father. This has been done in Greece where the Homeric heroes begin their prayer "*Zeu Pater*"; in Rome were Jupiter, i. e., Jove the father, is worshiped; in ancient Persia, in Judea, in Christianity, in China (where God is called *Shang Ti* = the emperor on high) and elsewhere. But this God-conception must not be taken literally, for God is not and cannot be an individual personality; God is super-personal. He is not a person in the sense of a concrete human personality, with human limitations in space and time, with successive thoughts, deliberations and final decisions. His thoughts are the eternal norms of existence, called laws of nature by scientists, and wherever there is a truth that has never originated and will never pass away it is a thought of God, for God is the ultimate

norm of truth, the ultimate standard of goodness, the prototype of right, the authority of moral conduct.

If God were an individual being, there would be above him the divinity of the eternal norm of all order. A divine individual, were he ever so grand, would be *a god*, not God, and if we call a god-individual "God" there would be a higher authority above God, there would be the Over-god, whose norms this individual god-being would have to heed, a view which would lead us to fantastic and mythological ideas. Accordingly it will be soberer and truer to reserve the name God for that absolute Divinity who is the normative factor that shapes the world and who at the same time remains to all his creatures the ultimate authority of moral conduct.

The world with all its wonderful display of life is the result of the cosmic order. There is an eternal law that shapes its *telos*, its aim and end. It is the divine dispensation according to which from the very beginning the springs which prompt existence unfold themselves and manifest their inmost meaning. Thus existence tends with mechanical necessity to realize itself, and in doing so it manifests the divinity of the world order whose most general features are mechanical.

The intrinsic nature of the world order is best understood by a contemplation of the order that prevails in all the purely formal sciences, in mathematics and logic, in arithmetic and algebra, which is most obvious and presents itself visibly to the eye in geometry. If there is anything that deserves the name supernatural we must grant this term to these purely formal sciences or rather to the truths which they reveal. They hold good not only in nature as it presents itself to our experience, not only in this world of ours in which we live, but in all possible worlds which might exist anywhere or anywhen, and they will remain true even if nothing existed at all.

The direction of all motion of the world is not artificially imposed upon it from the outside, it is immanent; and the appearance of rational purpose-ensouled beings is a necessity in the development of life, because the cosmic order renders the growth of rationality necessary. Rationality as a matter of truth, is nothing but the recognition of the cosmic order and the practical application of this recognition, the recognition of the cosmic order, of the nature of causation, of the mechanistic principle, changes wild haphazard motions into the provident actions of a purposive will.

We reach the conclusion that a belief in the divinity of man, in his responsibility and in his freedom, is quite justified, even on the recognition of the mechanistic principle, and that the popular errors held about these ideas on either side, from the teleological and from the mechanistic standpoints, are mistakes which by no means touch the essential truths which obtain in both.

A deeper investigation into the constitution of existence and the significance of natural, and especially mechanical, laws proves that a scientific interpretation of the facts will by no means degrade the character of man or give us cause to embrace a dreary pessimism. The laws of mechanics are the most general laws of the universe. Nothing moves, nothing stirs nor happens that does not act in agreement with the laws of motion, and there is no harm in it that man's activity takes place in perfect agreement with mechanical laws.

A man's a man for a' that!

EDITOR.